

## WAVES & SOUND OVERVIEW SHEET: Ch.'s 20 & 21

### VA SOL Objectives:

- PS.8 The student will investigate and understand the characteristics of sound waves. (SOL PS.8)
- PS.9 The student will investigate and understand the characteristics of transverse waves. (SOL PS.9)
- PS.8.1: Investigate the characteristics of sound waves: wavelength, frequency, speed, amplitude, rarefaction, and compression. (SOL PS.8.a)
  - PS.8.2: Describe what resonance is. (SOL PS.8.b)
  - PS.8.3: Explain the nature of compression waves. (SOL PS.8.c)
  - PS.8.4: Describe technological applications of sound waves. (SOL PS.8.d)
  - PS.9.1 Explain wavelength, frequency, speed, amplitude, crest, and trough. (SOL PS.9.a)

### Essential Questions:

How does a medium affect wave movement?

Explain the difference between refraction and diffraction:

What is sound?

What characteristics of the medium affect the speed of sound?

What characteristic of sound is determined by frequency? By amplitude?

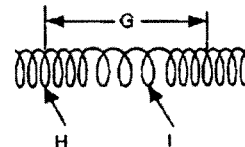
Name three application of sound (where sound waves are used for more than hearing)

### Vocabulary:

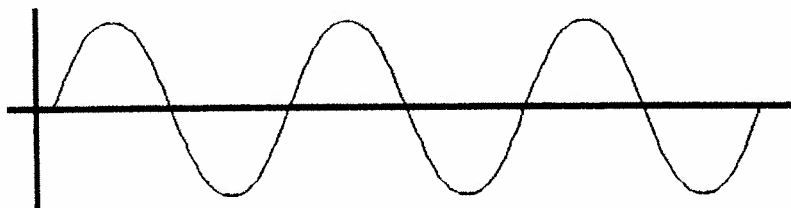
Wave	Medium	Longitudinal	Compression	Rarefaction	Wavelength
Amplitude	Frequency	Interference	Resonance	Pitch	Doppler Effect
Decibel	Hertz	Echo	Crest	Trough	

### Know:

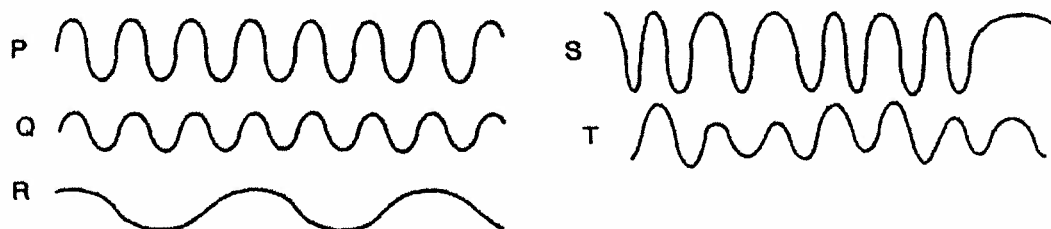
- The \_\_\_\_\_ of a wave is a measure of the amount of energy it carries.
- The distance from one crest to the next crest is the \_\_\_\_\_.
- The \_\_\_\_\_ is a measure of the number of waves that pass a point in a given amount of time.
- Letter H represents a \_\_\_\_\_
- Letter I represents a \_\_\_\_\_
- What units measure frequency?
- An increase in pitch is shown through an increase in this wave property:
- Why are soft materials used in Movie Theater walls?
- The motion of the medium is parallel to the direction of the wave in a series of compressions and rarefactions is what type of wave:
- The law of reflection states:
- What is the difference between ultrasonic and infrasonic?
- The amount of energy in a certain time, relates to amplitude is the definition of
- Reflection and interference patterns are used in \_\_\_\_\_ technology, including sonar and medical diagnosis.
- The speed of sound depends on these two things:
- Compressional/Longitudinal waves are this type of wave:
- What are some technological applications of sound:
  - a.
  - b.
  - c.
  - d.
- Give an example of Doppler Effect:
- Pitch: Higher \_\_\_\_\_ = higher pitch, Lower \_\_\_\_\_ = lower pitch
- How does ultrasonic differ from infrasonic?



6. On the diagram below, indicate the distance that represents the wavelength of the wave and indicate the distance that represents the amplitude.



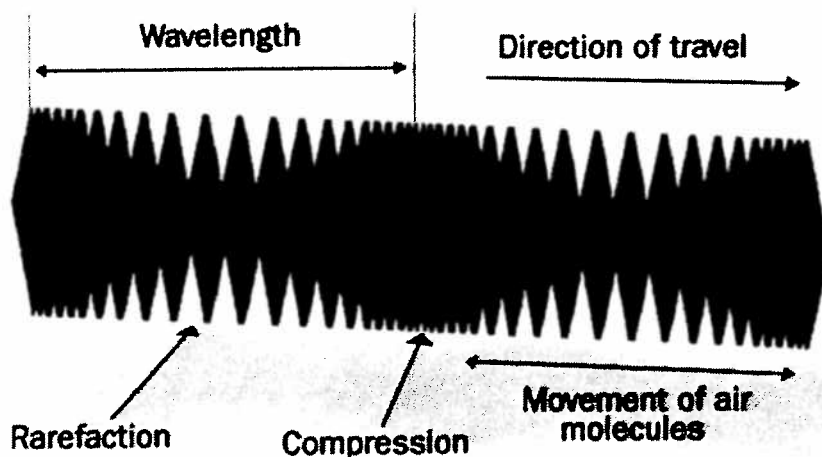
7. How many complete waves are there in the diagram above? Is it transverse or longitudinal?
8. What is the difference between a transverse wave and a longitudinal wave?
9. Are sound waves transverse waves or longitudinal waves? Why?



- (a) Waves P and Q have the same \_\_\_\_\_, but wave P has twice the \_\_\_\_\_ of wave Q.
- (b) Waves Q and R have the same \_\_\_\_\_, but wave R has twice the \_\_\_\_\_ of wave Q.
- (c) Wave \_\_\_\_\_ shows a steady frequency but changing amplitude.
- (d) Wave \_\_\_\_\_ shows steady amplitude but a changing frequency.
- (e) Waves \_\_\_\_\_ and \_\_\_\_\_ have a low amplitude and a steady frequency.

#### Informational only:

#### Longitudinal Wave



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If you study the diagram of the wave above, you'll see that longitudinal waves have the same basic characteristics as transverse waves. They have wavelength (the distance between two compressions), amplitude (the amount the medium is compressed) and frequency (the number of compressions that pass a fixed point per second). The amplitude of a sound wave determines its **intensity**, or loudness. The frequency of a sound wave determines its pitch,